

WHAT IS CLAIMED IS:

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2 1. A method of preparing a nucleic acid array on a support, said
3 method comprising synthesizing a plurality of nucleic acids on said support wherein the
4 synthesis steps are carried out in a non-oxidizing atmosphere.

1 2. A method in accordance with claim 1, wherein each nucleic acid
2 occupies a separate predefined region of the support, said synthesizing comprising:
3 (a) activating a region of the support;
4 (b) attaching a nucleotide to a first region, said nucleotide having a
5 masked reactive site linked to a protecting group;
6 (c) repeating steps (a) and (b) on other regions of said support whereby
7 each of said other regions has bound thereto another nucleotide comprising a masked
8 reactive site link to a protecting group, wherein said another nucleotide may be the same
9 or different from that used in step (b);
10 (d) removing the protecting group from one of the nucleotides bound to
11 one of the regions of the support to provide a region bearing a nucleotide having an
12 unmasked reactive site;
13 (e) binding an additional nucleotide to the nucleotide with an unmasked
14 reactive site;
15 (f) repeating steps (d) and (e) on regions of the support until a desired
16 plurality of nucleic acids is synthesized, each nucleic acid occupying separate predefined
17 regions of the support;
18 wherein each of steps (a) through (f) are carried out in a non-oxidizing
19 atmosphere.

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2 3. A method in accordance with claim 1, wherein said synthesizing
3 comprises the sequential steps of:
4 a) generating a pattern of light and dark areas by selectively irradiating at
5 least a first area of a surface of a substrate, said surface comprising immobilized
6 nucleotides on said surface, said nucleotides capped with a photoremovable protective
7 group, without irradiating at least a second area of said surface, to remove said protective
8 group from said nucleotides in said first area;
9 b) simultaneously contacting said first area and said second area of said
10 surface with a first nucleotide to couple said first nucleotide to said immobilized

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nucleotides in said first area, and not in said second area, said first nucleotide capped with said photoremovable protective group;

c) generating another pattern of light and dark areas by selectively irradiating with light at least a part of said first area of said surface and at least a part of said second area to remove said protective group in said at least a part of said first area and said at least a part of said second area;

d) simultaneously contacting said first area and said second area of said surface with a second nucleotide to couple said second nucleotide to said immobilized nucleotides in at least a part of said first area and at least a part of said second area;

e) performing additional irradiating and nucleotide contacting and coupling steps so that a matrix array of at least 100 nucleic acids having different sequences is formed on said support;

with the proviso that steps (a) through (e) are performed in said non-oxidizing atmosphere, and said atmosphere has an ozone concentration of from about 0 to about 5 ppb.

4. A method in accordance with claim 3, wherein said atmosphere is carbon-filtered air.

5. A method in accordance with claim 3, wherein said atmosphere is an inert gas.

6. A method in accordance with claim 3, wherein said atmosphere is argon.

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7. A method in accordance with claim 3, wherein said substrate is irradiated with light directed from a source at a position opposite the surface comprising said immobilized nucleotides.

8. A method in accordance with claim 3, wherein said substrate is irradiated with light directed from a source on the same side of the surface comprising said immobilized nucleotides.

9. A method in accordance with claim 3, wherein said substrate is irradiated with light from a position opposite the surface comprising said immobilized nucleotides and said atmosphere is an inert gas atmosphere.

1 10. A method of preparing and packaging a nucleic acid array, said
2 method comprising,

3 (a) preparing a nucleic acid array according to the method of claim 1; and

4 (b) packaging said nucleic acid array in an enclosure having a non-
5 oxidizing atmosphere.

1 ^{SUB}
2 ^{AY} 11. A method in accordance with claim 10, wherein each of said steps
is conducted in a facility having an atmosphere comprising 5 ppb or less ozone.

1 12. A method in accordance with claim 10, wherein for the period of
2 time between said preparing and packaging steps, said nucleic acid array is exposed to
3 unfiltered air for a period of 2 hours or less.

1 ^{SUB}
2 ^{A5} 13. A method of preparing a nucleic acid array, said method
comprising attaching each of a plurality of nucleic acids to a solid support at preselected
3 locations to provide said array, wherein said attaching is carried out in a non-oxidizing
4 atmosphere.

1 14. A method in accordance with claim 13, said atmosphere
2 comprising ozone at a concentration of from about 0 to 5 ppb.

1 15. A method in accordance with claim 2, wherein each of said nucleic
2 acids comprise from 5 to 30 nucleotide residues.

1 16. A nucleic acid array prepared by the method of claim 1.

1 17. A nucleic acid array prepared and packaged by the method of claim
2 10.

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